# TAKING WOMEN AND FOREST INTO ACCOUNT : DEVELOPING A WOODSTOVE FOR A HEALTHY AND SUSTAINABLE HOUSEHOLD IN CENTRAL AMERICA

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## INTRODUCTION

Many countries in Central America as Guatemala, El Salvador, Honduras and Nicaragua still depend very much on wood as an energy source. In the specific case of Honduras and Nicaragua, about 60% of the total energy demand is satisfied with fuel wood, since over 50% of the households use it as primary cooking fuel. Fuel wood represents 90% of the overall domestic energy consumption in both countries.

This dominant participation of fuel wood in the overall energy scenario is due mainly to highly inefficient woodstoves. Traditional woodstoves are open fire or semi-open fires such as three stone fire or U shaped stoves. These traditional stoves in general use only 8 to 14% of the energy available in the wood, wasting the remaining energy throught incomplete combustion and radiation.

The immediate result of this high inefficiency is a wasteful consumption of fuelwood, with high cost for the family (either in money for urban families or in recollection time for rural families). Furthermore, there is an enormous environmental cost due high demand for fuel wood and its impacts on deforestation, and air pollution. Air pollution is of key importance because it occurs mostly at indoor level, affecting directly the health of women and children, those most exposed. Indeed, acute respiratory infections is the second leading cause among infants in both countries, which is highly related to indoor air pollution.

Although being the major energy source of these countries, fuelwood doesn't have any political priority. In contrast, petroleum derivates and electricity have full political attention, with huge government and private organizations dedicating their human and economical resources to improve availability, quality and price for the benefit of consumers. In the other hand, fuelwood for being the energy source of the poorest of the society, and mostly used by uneducated women, in general doesn't have even one government employee fully dedicated to work in pro of benefit of the consumers.

When considering the forest sector authorities, the same policy applies. No regard for fuelwood supply, prices, quality and sustainability. No one single employee assigned to fuel wood, while all resources and personnel are dedicated to forest industry and conservation.

In resume, regarding wood as a household fuel, the forest and energy policies has no concerns for the environmental impact, efficient use, availability and affordability for the benefit of the poor women. The general political approach to it is. " It is an energy source of the past, and with progress it will eventually disappear". However, many decades has past, and the socio-economical situation of these countries has not improved enough, to justify a massive switch from traditional to modern fuels. We are already in the XXI century, while the majority of Nicaraguans and Hondurans continue to cook with wood, but still using XV century wood burning technology.

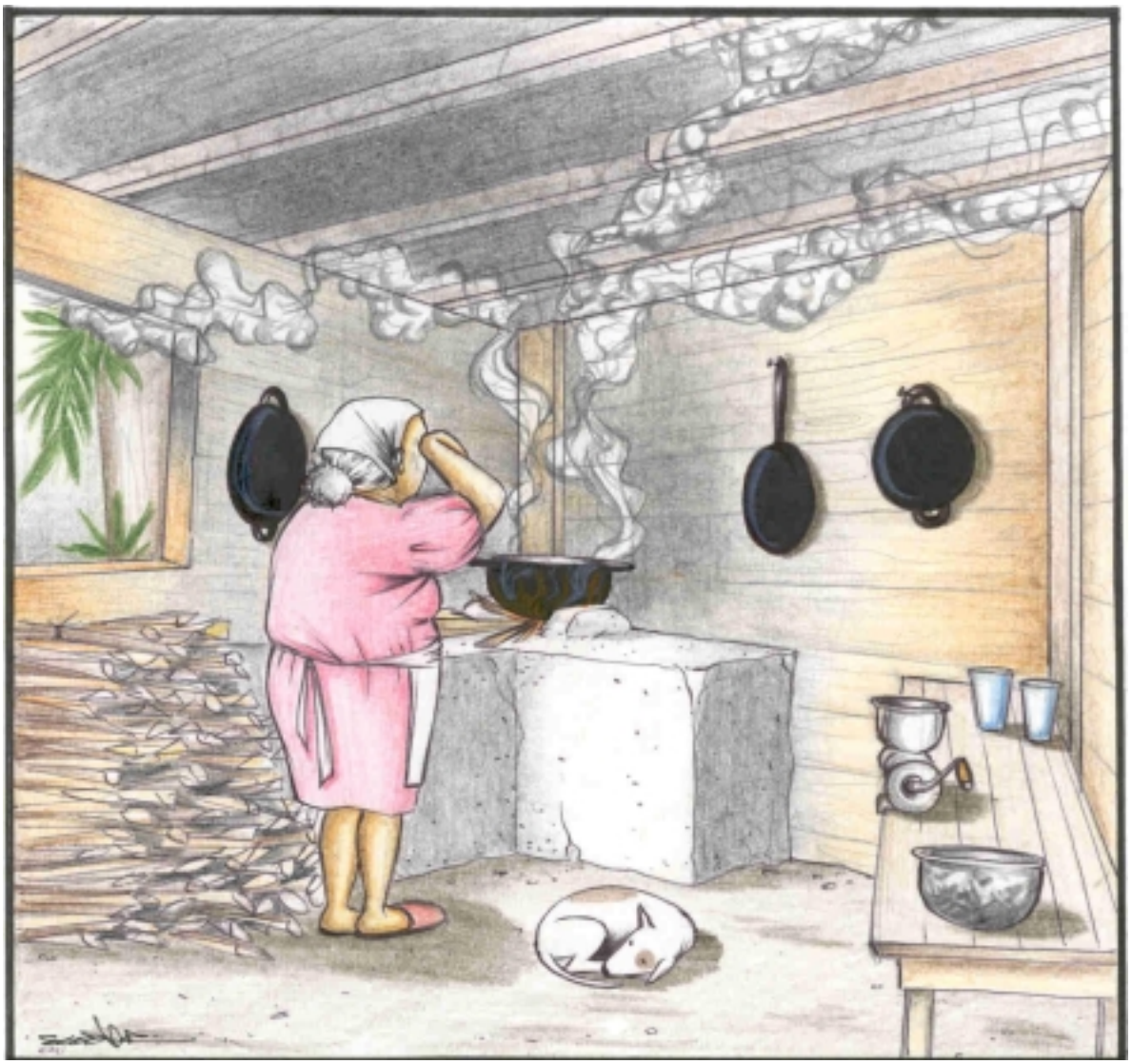
## PAST APPROACHES

During the 80´s, with the energy crises and the growing concerns for the environment, an effort was made to improve efficiency of the traditional woodstoves. The result was an enclosed fire stove with 3 open burners, a chimney and hand-made from mud, and the most well know model is the "Lorena stove". The Lorena stove if well built, operated and maintained, can increase efficiency to 16-18% while reduces indoor air pollution with a chimney.

However, as pointed out by PROLEÑA´s 2050 households energy surveys in urban Pacific Nicaragua (financed separately by ESMAP in 1998 and IDB in 1999), the Lorena and other similar design woodstoves, did not resolved the energy problem facing most of the women. First because these stoves were mostly self-constructed, its quality was poor and maintenance was as well poor, resulting in not better efficient stove than open fires. Also, because it was only promoted by NGO´s and development projects, its dissemination was restricted to their working territories. For instance, only 5% of the urban fuelwood users of the Pacific region of Nicaragua in 1999 (the most develop and populated region of the country), were aware of improved woodstoves such as Lorena, and only 3% did have one. It was not available for the pubic in general.

Based on this household energy survey (which interviewed mostly women) and in early stoves experiences, PROLEÑA realized that in order to provide most of the women of Honduras and Nicaragua with a modern and accepted woodstove, the following criteria's should be met:

- Self-construction should be avoided, for quality reasons. Professional construction would provide a better quality stove with good performance.
- A clean working environment should be the rule. Most women desire a smokeless and soot free kitchen.
- Outstanding efficiency should be the case. The fuel wood cost was dragging too many resources from already poor urban families.
- Presentation is essential, to improve the quality of the kitchen environment, and improve women self esteem and the importance of its work as the family cooker.
- Micro-credit for stove acquisition should be provided, considering that many women run household businesses such as sales of tortillas, beans and other foods, and therefore have repayment capacity.



**Picture # 1**
Reasons to not use fuel wood in the traditional way: high fuel consumption, smoky environment, and sooty pots.

**THE ECOSTOVE DEVELOPMENT**

PROLEÑA first started working in a smoke less stove in Honduras. By suggestion of PROLEÑA´s leading promoter, Mrs. Justa, a metal griddle was adapted over the lorena stove, to provide a barrier against the smoke, forcing it out through the chimney. The griddle also eliminated the direct contact of the flames with the pots, resulting in a soot free cooking surface. Furthermore, it also provided excellent conditions for cooking “tortillas” directly on it (a staple food in Central America) and a heat surface big enough for cooking more than 2 pots at the same time. This stove was then called “Plancha Stove”.

Although the griddle was well accepted by the Honduran women as a clean feature, however the metal griddle reduced stove efficiency. It became a barrier to direct heat transfer from the flames to the pot, and at the same time a exposed radiating surface with heat losses.

Just after hurricane Mitch hit Central America in October 1998, a team from "Aprovecho", an appropriate technology group based in Oregon, USA, visited Honduras to promote its highly efficient (22-25%) "Rocket woodstove". This woodstove is an insulated single burner stove without a chimney, with direct contact between flames and pots. Aprovecho´s team quickly realized that women were very interested in the clean features of the Plancha Stove, and therefore decided tocombined the Rocket stove with the Plancha Stove. The rocket provided the highly efficient combustion chamber, while the Plancha Stove provided the smoke and soot free features. The result was a compromise stove, although less efficient than the Rocket stove, but with much better efficiency than the Plancha Stove and with the same smoke and soot free features. This new stove was then called "Justa Stove", in honor of Mrs. Justa, who was the most enthusiastic about this new stove.

The Justa Stove produced in average 50% less fuel consumption than the traditional three stone stove, and practically no indoor smoke emission. So far over 500 Justa Stove's have been disseminated in rural and urban communities of Honduras.

After evaluating the information gathered by the urban household surveys of the Pacific region of Nicaragua, PROLEÑA realized that the majority of fuel wood users have no access or knowledge on improved woodstoves since the technology was only restricted to NGO´s and development projects working territories.

The way to break that barrier was to industrialize it for mass production, while making it widely available to the general public through local town markets. With that in mind, a compacted version of the Justa Stove within a metal framework was designed. This new version could be assembled in a metal workshop allowing quick and mass production. This reduced the costs of making the stove and made it more accessible to many more housewives. This new stove is called the "Ecostove", due its economical and ecological features.

Furthermore, the household survey pointed out that a nice looking stove was more desirable when the family is shopping for a new stove. In this way pretty colors are painted on the Ecostove to make it more attractive.

**Picture # 2**
Reasons to use fuel wood in a modern way: low fuel consumption, smoke free, soot free, compact, pretty and allows cooking of more foods at the same time.

**DISEMINATION**

With this appropriate technology in hand, PROLEÑA started in Nicaragua a pilot project to evaluate its acceptance. From March to September 2000, a number of 160 stoves were disseminated to urban and rural communities in the country. Some bought in cash, some in credit while others were subsidized by development organizations.

During this period, an informal evaluation demonstrated that over 70% of Ecostove was accepted by the urban and rural households. Although in rural areas in many cases it is being used as a luxury appliance, used only in special occasions, like family gathering or when receiving visitors.

The most attractive feature of the Ecostove is the clean environment, e.g., no smoke nor soot. Housewives appreciated this feature, claiming no more headaches, itching eyes, bad smell and sooty pots. The second most appreciate feature is the savings. It reduces about 50% on fuel wood consumption. Also, other appreciated features includ the compact size, the good-looking presentation, and allows cooking of many dishes at the same time. Since it is a surface-cooking stove, it only accepts flat bottom pots in order to cook efficiently.

However, the most crucial barrier is the price, of about US$ 60 each, which is a scarce resource among very poor families in Nicaragua. For those with repayment capacity, micro-credit financing should be available, while others without repayment capacity, a less expensive model should be developed. In this regard, PROLEÑA is forming alliances with several micro-financing agencies in Nicaragua, to provide financing for Ecostove clients such as household business and housewives.

The Ecostove success has attracted interest from international development agencies. For instance USAID/Nicaragua is now supporting a dissemination phase, which includes strengthening the production capacity and a push for marketing of the Ecostove among NGO´s, development projects, micro-financing agencies and public markets. A massive media campaign will also be launched, to introduce to the general public the Ecostove. USAID main interest is in reducing deforestation and indoor air pollution.

In the other hand the ESMAP program of The World Bank and UNDP will in 2001 support the development of a less expensive model of the Ecostove and other alternatives. Their main purpose is to reduce indoor air pollution, extreme poverty, and to create a new micro industry to manufacture wood stoves with the participation of the private sector.

The Brazilian Cooperation Agency (ABC) has requested the transfer of this technology to their country as an alternative cooking device for their rural communities while the National Energy Commission of Nicaragua (CNE) will provide funds for a micro-credit scheme to finance energy efficient woodstoves fo household tortillas producers.

Furthermore, PROLEÑA is negotiating with the NGO, PRO-MUJER (PRO-WOMEN), a specific micro-credit scheme aimed to facilitate access to credit for housewives without income, within a solidarity credit system.

In conclusion, the Ecostove was designed taking women´s concerns in consideration, as well as to minimize the environmental impact on forests. It is a modern wood-burning appliance suited for the developing world, which can be built by local industry and with locally available materials. However it requires a new cooking technique and in most cases a micro-credit financing scheme. So far the acceptability of the Ecostove is very encouraging, and PROLEÑA is working to learn new opportunities to promote it as well as to share its knowledge with other development organizations and private sector.

**Picture # 3**
*The Ecostove.*